REMARKS

Introduction.

This amendment is with an RCE responsive to a final rejection September 27, 2005. While the applicants do not agree (1) with how the Examiner interpreted and applied the references or (2) with her conclusion of obviousness of the then pending claims, applicants appreciate the Examiner's comment at the bottom of page 5 of her office action that "[T]he prior art however do not teach the carrier web for the circuit pattern and the IC being a polyester or a biaxially oriented propylene." In view of that statement, applicants are filing a declaration with this RCE to overcome the Examiner's concern that the selection of a polyester and polypropylene for the carrier web film is not a mere matter of design choice.

All of the independent claims with this amendment provide that the carrier web comprises polyester or biaxially oriented polypropylene. Applicants assert that no reference alone or in combination suggests the claimed combination which requires the combination of the careful selection of a carrier web of polyester or a biaxially oriented propylene with a chip and antenna mounted thereon, with a thermoplastic film overlying the carrier web surface with the chip, all of which are melt mounted with an injection moulded part through the thermoplastic film.

In view of (1) the Examiner's acknowledgment that the prior art does not show an article or method as claimed with a carrier web of polyester or polypropylene, (2) the declaration filed herewith and (3) the fact all of the claims now require a carrier web of polyester or polypropylene, applicants assert that the claims define a unique combination and should be allowed to issue. Applicants will provide more detailed discussion below as to why the references should not be viewed as rendering the pending claims obvious.

The Claims.

With this amendment, all of the independent claims (1, 10, 19, 23, 25 and 28) have been amended, dependent claim 26 has been amended, claims 14, 16, 22, 24 and 27 have been cancelled. Claims 1-5, 10-11, 13, 15, 17-21 23, 25-26 and 28-29 are pending. Without characterizing the claims to limit them, but merely as an aid for the Examiner, applicants provide the following summary of the now pending independent claims.

Claim 1 describes an injection moulded product, identifies the carrier layer as a film of biaxially oriented polypropylene and polyester and describes a melted thermoplastic intermediate layer.

Claim 10 describes a smart card, identifies the carrier layer as a film of biaxially oriented polypropylene and polyester and describes a melted thermoplastic intermediate layer.

Claim 19 describes an injection moulded radio frequency identification circuit product, identifies the carrier film as polyester and biaxially oriented polypropylene, describes an intermediate layer over and under the carrier film substrate, each intermediate layer selected from the group consisting of a melted thermoplastic extruded layer and a melted thermoplastic adhesive bonding film, the injection moulded body overlying and attached to the intermediate layers, and the intermediate layers having been melted to bond the carrier film substrate to the injection moulded body.

Claim 23 describes a smart card, identifies the carrier layer as a film of polyester and biaxially oriented polypropylene and specifies an extruded thermoplastic intermediate layer.

Claim 25 describes an injection moulded product, identifies the carrier layer as a polyester or biaxially oriented polypropylene film and specifies an extruded intermediate thermoplastic layer.

Claim 28 describes an injection moulded product, identifies the carrier layer as a film of biaxially oriented polypropylene and polyester and describes a melted thermoplastic bonding film as the intermediate layer.

The Present Application And The Problems Solved By Applicants.

The subject matter of the present application is directed to an injection moulded product which has a "smart card blank" embedded in it, or a smart card blank is attached to the injection moulded layer or product. The smart card blank is attached to the injection moulded product via a thermoplastic resin which is sometimes referred to as an "intermediate layer" in the application. The intermediate layer(s) is attached to the substrate to form a smart card blank, the blank with the intermediate layer is placed into an injection mould, and a molten thermoplastic is injected into the mould. The intermediate layer(s) melt from being exposed to the hot injected thermoplastic. The intermediate layer(s) form a bond between the injection moulded product and the smart card blank.

In the past when smart cards were attached or embedded to injection moulded products, they had to be attached to the surface of the product after the injection moulding process by gluing the smart card onto the surface of the product. In the case of embedding, the smart card was added into a mould beforehand and hot plastic was injected on it. However, a common problem was that air remained inside the product which produced a cave near the smart card. Thus, the strength of the

injection moulded product was weakened. The product and method described this patent application solves the latter problem in the prior art. In the product and method of this patent application, an integrated circuit on a chip and a circuitry pattern are on the surface of a carrier web. An intermediate layer overlies the surface of the carrier web. The intermediate layer is attached to the carrier web to provide a multilayered film smart card with the chip and circuitry pattern before the injection moulding process. The intermediate layer of the smart card achieves a firm bond between the injection moulded material and the smart card. The intermediate layer melts when the injection moulded material, i.e. hot plastic, meets the smart card and thus the firm bond is formed between the smart card and the injection moulded product and no caves exist. Materials for the carrier web and intermediate layer, however, have to be carefully selected and not just any polymeric film will be suitable for each layer. The nature of each of these films has to accommodate the high speed production of the smart card to be used in the injection moulding process, yet also must survive the injection moulding process without being distorted and having the chip and/or antenna destroyed. See attached declaration.

Multilayered products with a chip and antenna carried between two films are known. Most have been laminated between polyvinyl chloride (PVC) layers or acrylonitrile/butadiene/styrene (ABS) layers. ABS is harder and more difficult to process. These materials do not tolerate higher temperatures needed to mount the antenna and chips on a carrier web and have required less advantageous lower mounting temperatures or complex mounting procedures. Films with higher softening temperatures result in poor processing and are not readily heat sealed to each other. See attached declaration.

The carrier web must be a film with a stiffness, thermoresistive properties, high tensile strength and proper optics which permit it to be used as part of a smart card, and permit the multilayered smart card to be made in high speed processing before it is inserted into the injection mould. Even further, the film of the carrier web must be resistant to temperature degradation, as well as not buckle or warp during the injection moulding process to make the product which is the subject of this patent application. See attached declaration.

It is important that a carrier web, which has an integrated circuit on a chip and a circuitry pattern on its surface, does not melt due to hot plastic in the injection mould. The smart card is destroyed if the carrier web melts. The circuitry pattern on the carrier film has a precise size and shape, and the integrated circuit on the chip on the carrier film has a precise position in regard to the

circuitry pattern. All of the latter positioning changes if the carrier web melts and looses its dimensional stability. Therefore, it is important to select the material of the carrier web so that it does not melt during the injection moulding process. Polyester and biaxially orientated polypropylene are unique in that they permit the high speed manufacture of the smart card, but have properties that will survive the injection moulding process. See attached declaration.

The use of the carefully selected carrier web in combination with a lower melting thermoplastic intermediate layer which melts to affix the smart card to an injection moulded product provides a combination which is not only unique, but is a result of the careful selection of materials to provide a combination of low melting intermediate layer, and a high melting carrier layer web with specific properties which solve a previously unsolved problem in the prior art. See attached declaration.

The thermoplastic resins forming the "intermediate layer" provide benefits beyond just a firm bond. Without the thermoplastic resin, the blank can wrinkle (possibly adversely affecting the antenna and the integrated circuit) and not form a bond with the injection moulded material. With the thermoplastic material, the carrier web layer or smart card blank remains straight inside or on the surface of the injection moulded product. Moreover, when a thermoplastic film is used as the intermediate layer, a "smart card blank" can be fabricated, such as by extruding a thermoplastic film onto a substrate web with an integrated circuit and circuitry pattern. The latter fabrication then can be placed into an injection mould to bond and/or embed the smart card blank into the injection moulded layer or body.

The Rejection.

The examiner rejected claims 19-21, 23, 25-26 and 28-29 as anticipated by USPN 5,590,773 to Fidalgo; claims 19-23, 25-26 and 28-29 as anticipated by Jarvis; claims 1-5, 10-11, 13-29 as anticipated by Haghiri-Tehrani; and claims 1-5;10-11 and 23-26 as anticipated by Chung. The section 102(b) rejection of claims 14, 15, 16, 22, 24, 27 and 28 was incorrect. Applicants assume it was inadvertent in view of the Examiner's acknowledgment that "[T]he prior art however do not teach the carrier web for the circuit pattern and the IC being a polyester or a biaxially oriented propylene." The examiner, however, also made an obviousness rejection of all of the claims in view of the combination of the references.

The References.

Fidalgo

In the last office action the Examiner indicated that Fidalgo's electronic module is the carrier web and polyurethane adhesive is the intermediate layer--see lower middle of page 3 of the office action – where the Examiner stated "[T]he examiner takes the position that the substrate (5) in the electronic module (4) resembles the carrier web and the polyurethane adhesive material (8) resembles the intermediate layer of the present invention." Applicants submit that the Examiner's interpretation of Fidalgo shows that that reference does not anticipate or render the pending claims obvious. Substrate 5 is not identified as a "film" and is certainly not identified as polyester or biaxially oriented polypropylene. But these are not the only reasons why Fidalgo does not render the pending claims obvious.

Fidalgo deposits a frame on a lower thermoplastic sheet 2. The frame demarcates the edges of a cavity. An electronic module is placed in the cavity on sheet 2 and the cavity is filled with thermosetting resin 8. See column 4, line 44 of Fidalgo. An upper thermoplastic sheet 10 is placed over the polymerizable resin. Fidalgo does not describe the use of the thermoplastic resin between a carrier web and an injection molded product which bonds the injection molded product to a carrier web. The way the Examiner interprets Fidalgo, a melted intermediate thermoplastic film does not bond a substrate sheet to an injection moulded layer. Rather in Fidalgo, a drop of adhesive (which does not appear to be thermoplastic) bonds the electronic module 5 to thermoplastic sheet 2. See column 4, lines 5-6.

The way the Examiner interprets Fidalgo, Fidalgo glues his IC circuit onto a thermoplastic substrate 2 and then fills the surrounding cavity with resin 8. Fidalgo's thermoplastic sheets end up on the outside of the injection moulded resin. These sheets do not affix the circuit to the injection moulded resin. Fidalgo's product simply does not have a structure where a thermoplastic resin is used to affix an IC circuit onto an injection moulded substrate.

Haghiri-Tehrani

Haghiri does not involve injection moulding, a circuitry pattern is NOT on the surface of a carrier web (which the Examiner says is carrier element 6), the carrier web is not polypropylene or polyester, and as far as applicants can see there are no cover films overlying the printed

circuitry pattern on the surface of a carrier film. Rather Haghiri's IC module is embedded in a carrier element 6. The carrier element is not a film which carries the chip and antenna on its surface as presently claimed. Haghiri's films 12, 13 do not bond a chip on a carrier film to an injection molded product.

Jarvis GB 612

Jarvis does not describe any injection moulded part. Moreover, Jarvis' circuitry pattern is on a substrate of epoxy/glass 12 (see page 4, first full paragraph) with PVC layers over and under the epoxy/glass carrier with the circuitry pattern. There is no carrier layer of polyester or biaxially oriented polypropylene. Polyester reinforcing layers 39&40 are put over and under the substrate of epoxy/glass layer 12 and yet two more PVC layers 37&38 are put over and under the reinforcing layers, see Fig 11 and the abstract.

Chung

As seen Figures 5 and 9 of Chung, Chung has no injection moulded part. The Examiner appears to say that 306 which is an adhesive should be taken as in intermediate layer and 308 should be taken as a substrate layer (which the Examiner should not confuse with an injection moulded layer or body). The Examiner's interpretation of the reference leaves the absence of an injection moulded part. Moreover, there is no polypropylene or polyester carrier layer and there is no circuitry pattern printed on a carrier layer film, especially a polypropylene or polyester film.

The Claims Are Not Anticipated Or Obvious In View Of The References Alone Or In Combination.

The references cited and applied by the Examiner do not address the problem solved by the applicant, nor do they suggest the solution of the problem.

Applicant has a structure that avoids wrinkling a substrate base with a circuitry pattern and an integrated circuit. The application of the thermoplastic protects the circuitry pattern, circuit and chip. Moreover as noted at page 3, lines 5-11 of the specification, the thermoplastic intermediate layer and the injection moulding layer protect the circuitry pattern and the chip, the uneven surface of the smart card blank can be flattened out by the injection moulding layer, and

the manufacturing costs are low. No reference alone or in combination suggests the claimed combination which requires the combination of the careful selection of a carrier web of polyester or a biaxially oriented propylene with a chip and antenna mounted thereon, with a thermoplastic film overlying the carrier web surface with the chip, all of which are melt mounted with an injection moulded part through the thermoplastic film.

Conclusion

In view of the foregoing, applicant respectfully requests reconsideration and allowance of the pending claims.

Respectfully submitted,
Fitch Even Tabin & Flannery

Timothy E. Levstik
Registration No. 30,192

Date: February 27, 2006
120 South LaSalle Street, Suite 1600
Chicago, Illinois 60603
T: 312.577.7000
F: 312.577.7007